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GEOPHYSICAL VARIABLES AND BEHAVIOR: LIV. ZEITOUN (EGYPT) APPARITIONS OF THE VIRGIN MARY AS TECTONIC STRAIN-INDUCED LUMINOSITIES

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Summary.—Temporal analyses were completed between the occurrence of intense displays of exotic luminous phenomena over a church in Zeitoun (Egypt) during the years 1968 through 1969 and regional seismicity. These phenomena, viewed by thousands of onlookers, began one year before an unprecedented increase (factor of 10) in seismic activity about 400 km to the southeast. Monthly analyses also demonstrated a moderate (0.56) correlation between increases in seismicity and the occurrence of luminous phenomena during the same or previous month. These results were interpreted as further support for the hypothesis that most anomalous (terrain-related) luminous phenomena are generated by factors associated with tectonic strain.

Between April 1968 and May 1971 hundreds of thousands of people reported seeing apparitions of the Virgin Mary over a Coptic Orthodox Church in Zeitoun, near Cairo, Egypt (Johnston, 1980; Palmer, 1969; Zaki, 1978). When photographed, these phenomena appeared as irregular blobs of light. Primarily there were two types of events: small, short-lived highly kinetic lights ("doves") and more persistent coronal type displays that were situated primarily over the apical structures of the church. More detailed descriptions of the phenomena, such as visions, often occurred as "flashes"; their details usually reflected the religious background of the experient (Johnston, 1980).

The characteristics of these luminous phenomena strongly suggested the existence of tectonic strain within the area. According to the hypothesis of tectonic strain (Persinger, 1983b; Persinger & Derr, 1984, 1985a, 1985b; Derr & Persinger, 1986), anomalous luminous phenomena are generated by brief, local changes in strain that precede earthquakes within the region. Psychological factors determine more elaborate details of the experiences because there are both direct stimulations of the observer's brain (Persinger, 1983a) as well as indirect contributions from reinforcement history (Persinger, 1984).

If this hypothesis is valid for the present episode of extraordinarily vigorous luminous phenomena, then these phenomena should have preceded an

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extraordinary increase in seismic activity within the region. To test this supposition, the days in which these events occurred were determined from all available published reports (Johnston, 1980; McClure, 1983; Palmer, 1969; Zaki, 1978). In addition, the numbers of earthquakes that occurred within 500 km of Zeitoun were obtained from the central US Geological Survey computer Hypocenter Data File for the years 1958 through 1979. This distance was selected on the basis of previous functional relationships between luminous phenomena and subsequent earthquakes.

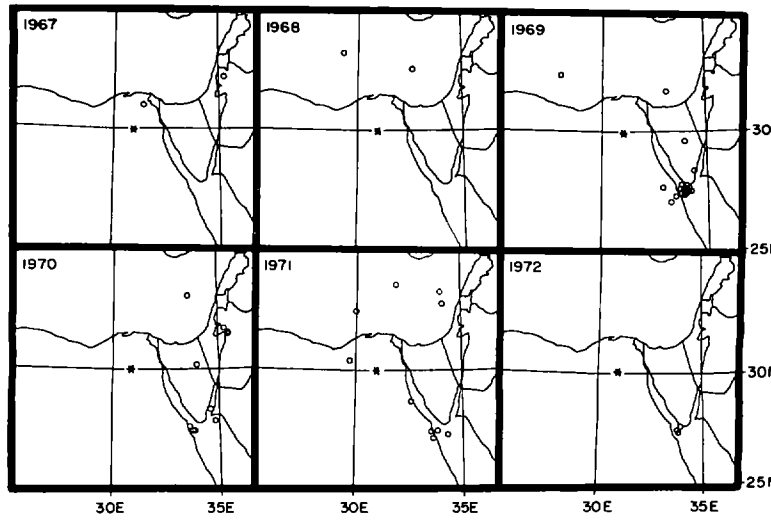

FIG. 1. Geographical distribution of epicenters for each year between 1967 through 1972. The vertical axis indicates degrees latitude while the horizontal axis indicates degrees longitude. The asterisk represents Zeitoun. Note the unprecedented increase (factor of 10) in the numbers of earthquakes (n = 38) at the southern tip of Sinai during 1969.

A macroanalysis was first completed to determine the temporal relation between the incidence of earthquakes and the relatively sudden onset and persistence of the luminous phenomena. The locations of seismic events within the region around Zeitoun are shown in Fig. 1. There was an unprecedented large swarm of earthquakes (n = 38) during 1969 approximately 400 km to the southeast of Zeitoun; they began abruptly almost one year (March 31, 1969, Ms 6.8) after the beginning of the luminous phenomena at Zeitoun (April 2, 1968). The seismic activity occurred in the Gemsa area in the Red Sea at the southern tip of Sinai. The numbers of earthquakes during 1969 were a factor of 10 greater than in any of the 10 years before or 10 years afterwards in the area. In addition, in 1974 there was a remarkable but smaller earthquake swarm 50 km north of Zeitoun; the largest magnitude was 5.2 ML.

The second level of analysis was to estimate the relation of numbers of luminous phenomena per month and the numbers of earthquakes per month. Visual inspection of the former data indicated that after the year 1970 the documentation was markedly reduced and displayed an obvious weekly cycle (associated with the visits of the person maintaining the diary). Consequently only the reports of luminous phenomena between April 2, 1968 and December 31, 1969 were selected. Days were designated as 0 (no phenomena recorded), 1 (small magnitude phenomena) and 2 (vigorous displays associated with at least an hour of luminous phenomena); the numbers of days for each category were 541, 32, and 65, respectively. The numbers of earthquakes per month and numbers of LP days per month were determined for the analysis period. To allow lag/lead analysis the numbers of quakes per month for January, 1968 through December, 1969 were included. To reduce the contribution from outliers, Spearman coefficients (NONPAR: SPSSX) were completed between the numbers of luminous phenomena for the month of or the month before (DO IF; SPSSX), the key month. This meant that the larger of the two monthly values (luminous phenomena of the same month or the month before) was used. To minimize the likelihood of computational artifacts, this value and the numbers of earthquakes were lagged such that correlations (coefficients given in parentheses) could be completed between the numbers of luminous phenomena the month after or two months after the quakes (0.11), luminous phenomena the month after or month of the quakes (0.33), luminous phenomena the month of or month before the quakes (0.56, $p \leq .01$), luminous phenomena the month before or two months before the quakes (0.28) or the luminous phenomena two months or three months before the quakes (–0.02). As indicated, *only* the numbers of reports during the same month or the month before the quakes were significantly correlated.

Microanalyses were completed between the numbers of luminous phenomena *per day*, earthquakes per day, and geomagnetic activity per day; the latter measure, daily Ap values (Leighton, 1969, 1970), was included because previous analyses indicated that sudden, intense variations in geomagnetic activity may serve as enhancement conditions for luminous phenomena but only if the region is undergoing strain as defined by consequent seismic activity (Persinger, 1985). Two forms of the geomagnetic data were used: (a) the absolute value of Ap and (b) the percent change in Ap from the previous day. The interval selected for analyses was April, 1968 through March, 1969; this reduced period was selected since Box-Jenkins analysis indicated a minimal 7-day autocorrelation ($r = 0.35$) within the data for luminous phenomena (most likely an artifact of the observational procedures), a factor that would have been less relevant for the previous analysis that involved *monthly* increments.

Multiple regression analyses (REGRESSION) were completed according to days in which luminous phenomena had been reported (n = 50) or not reported (n = 331); they served as the dependent variable (range 0,1). To allow entry of both quake and geomagnetic data (either the absolute or relative measures but not both for a given analysis) for the days before *and* after the luminous phenomena in accordance with the concept of symmetrical lag/lead analysis (Persinger, 1983b), a lag 6 of the key day was computed. As a result the 12 successive lag calculations for both the geomagnetic and earthquake data allowed these data to enter potentially for each of the six days before, the day of and for each of the six days after the key day. The multiple regression analyses produced weak ($F_{1,378}$ = 6.90, $p \leq .01$) multiple correlations (MR = 0.20) between the occurrence of luminous phenomena and the display of an earthquake on the same day only. None of the geomagnetic variables (absolute or relative changes) entered the equation. A discriminant function with less stringent admission criteria (pin $\leq$ 0.10) allowed entry of quake variables for the day of, day before, and day after the luminous phenomena (χ_3^2 = 14.53, $p \leq .01$). The function successfully classified 92% of the days for which no luminous phenomena were reported and 80% of the days for which clear luminous phenomena were reported.

The results of these analyses strongly suggest a tectonic strain factor in the appearance of luminous phenomena in Zeitoun during 1968 and 1969. That these phenomena were vigorous displays is indicated by their intraevent (minute to hour) and interevent (sometimes daily) periods. Consistent with the hypothesis of tectonic strain, the sudden and intense display of these phenomena preceded a sudden and intense increase (by a factor of 10) in seismicity within the region. The distance (about 400 km) between the focus of the luminous phenomena and the "functionally" related earthquakes is comparable to those noted in other studies (Persinger & Derr, 1984; Fishkova, Gothberg, & Pilipenko, 1985; Persinger & Derr, 1985; Derr & Persinger, 1986) and further attests to the importance of a regional tectonic strain factor in the etiology of anomalous luminous phenomena.

Luminous phenomena in Zeitoun increased during the month of or the month before an increase in regional seismic activity. Similar increases in these phenomena during monthly time-frames have been noted for Washington State (Persinger & Derr, 1984), Uinta Basin (Persinger & Derr, 1985), and Yakima (Derr & Persinger, 1986). The fact that there were no significant correlations between monthly luminous phenomena and earthquake activity after its occurrence, or between earthquakes and luminous phenomena more than one month before an increase in seismicity, reduces the likelihood of confounding factors from either analytical or observational procedures. The "narrow" window of significant temporal relationship

between luminous phenomena and earthquakes is within the classic time frame of more acceptable antecedents (e.g., microseismic activity) of imminent earthquake activity.

The failure to find strong daily relationships between luminous phenomena and either seismic or geomagnetic activity suggests that some fundamental variable has not been accommodated. No doubt the 7-day autocorrelation (which was only minimized, not eliminated) within the data base of the luminous phenomena as well as the sampling factors involved with reports by human observers, affected the strength of the relation. However, daily analyses have rarely been robust in other studies. Even the geomagnetic factor, which has been demonstrated to be a powerful cofactor in predicting luminous phenomena, is most effective when measures of *variability* are used for monthly or 6-mo. increments. Although daily precision in the prediction of less exotic geophysical phenomena is more difficult than monthly predictions, the determination of this unknown factor in the occurrence of luminous phenomena could facilitate the field testing of the tectonic strain hypothesis. We suspect that this factor may be coupled to the mechanism that precipitates the actual occurrence of the strain field (and hence the luminous phenomena) rather than the probability of its occurrence.

REFERENCES

DERR, J. S., & PERSINGER, M. A. Luminous phenomena and earthquakes in southern Washington. *Experientia*, 1986, 42, 991-999.

FISHKOVA, L. M., GOTHBERG, M. B., & PILIPENKO, V. A. Relationship between night air glow and seismic activity. *Annals of Geophysics*, 1985, 3, 689-694.

JOHNSTON, F. *When millions saw Mary*. Chulmleigh (UK): Augustine Publ., 1980.

LEIGHTON, H. *Solar-geophysical data, 1969, 296 and 1970, 308*. Boulder, CO: US Department of Commerce, 1969, 1970.

MCCLURE, K. *The evidence for visions of the Virgin Mary*. Wellingborough (Northamptonshire): Aquarian Press, 1983.

PALMER, J. *Our Lady returns to Egypt*. San Bernardino, CA: Culligan Pub., 1969.

PERSINGER, M. A. Geophysical variables and behavior: IX. Expected clinical consequences of close proximity to UFO-related luminosities. *Perceptual and Motor Skills*, 1983, 56, 259-265. (a)

PERSINGER, M. A. The tectonic strain theory of luminosities. *Pursuit*, 1983, 16(1), 21-35. (b)

PERSINGER, M. A. Geophysical variables and human behavior: XVIII. Expected perceptual characteristics and local distributions of close UFO reports. *Perceptual and Motor Skills*, 1984, 58, 951-959.

PERSINGER, M. A. Geophysical variables and behavior: XXI. Geomagnetic variation as possible enhancement stimuli for UFO reports preceding earthtremors. *Perceptual and Motor Skills*, 1985, 60, 37-38.

PERSINGER, M. A., & DERR, J. S. Geophysical variables and human behavior: XIX. Strong temporal relationships between inclusive seismic measures and UFO reports within Washington state. *Perceptual and Motor Skills*, 1984, 59, 551-556.

PERSINGER, M. A., & DERR, J. S. Geophysical variables and behavior: XXXII. Evaluations of UFO reports in an area of infrequent seismicity: the Carman, Manitoba episode. *Perceptual and Motor Skills*, 1985, 61, 807-813. (a)

PERSINGER, M. A., & DERR, J. S. Geophysical variables and behavior: XXIII. Relations be-

tween UFO reports within the Uinta Basin and local seismicity. *Perceptual and Motor Skills*, 1985, 60, 143-152. (b)

ZAKI, P. *Our Lord's Mother visits Egypt in 1968*. Zeitoun, Egypt: Coptic Orthodox Church Publ., 1978.

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